

1. A hoist for accurately drawing a load comprising:
 - a housing providing a main frame for the hoist,
 - an elongated load screw having external threads and mounted for rotation within the housing,
 - a fitting on a first end of the load screw, accessible from outside of the housing and configured to receive a rotational driving input without longitudinal translation of the screw gear within the housing,
 - a load nut having internal threads engaged with the external threads of the load screw so that rotation of the load screw causes the load nut to move longitudinally along the axis of rotation of the load screw, with the direction of movement of the load nut being dependent on the direction of rotation of the load screw,
 - two wire cables, each having an inner end connected to the load nut within the housing and each having an outer end extending outside the housing, the two wire cables extending in opposite directions from the housing each for connection to a load,
 - two idler pulleys connected in the housing for rotation and each in the path of one of the wire cables, the two idler pulleys having axes of rotation perpendicular to a plane containing the load screw and inner ends of the wire cables, each pulley having

a peripheral groove for guiding a wire cable in tension, such that tension in the cables and motion of the cables in one direction due to rotation of the load screw is converted into said oppositely-directed motion and tension of the two cables outside the housing,

cable guide means in the housing and positioned adjacent to the inner ends of the wire cables, for guiding and partially confining the wire cables as they move within the housing, and

stationary pulley guides closely adjacent to an outer periphery of each of the idler pulleys to guide the wire cables in their passage around the pulleys and to generally retain the wire cables within the peripheral grooves of the idler pulleys even when not in tension.

2. The apparatus of claim 1, wherein the cable guide means within the housing comprises generally V shaped grooves extending longitudinally in the housing, each groove leading to one of the cable pulleys.

3. The apparatus of claim 1, wherein the load nut comprises a bar having two ends, each secured to one of the cable inner ends, the bar having a sufficient width to space the two cable inner ends significantly outward from the screw gear, and including, near each end of the bar, a spring-loaded wire cable

positioner bearing against the wire rope at a position on the wire cable spaced away from the connection with the bar and tending to push the wire cable into the cable guide means in the housing, thus keeping the two wire cables generally in position in the guides of the housing when little or no tension exists in the cables and when the load screw is rotated in a backing direction to feed cable out of the housing.

4. The apparatus of claim 3, wherein the cable guide means within the housing comprises generally V shaped grooves extending longitudinally in the housing, each groove leading to one of the cable pulleys.

5. The apparatus of claim 1, further including means connected to the load nut for generally maintaining the wire cables spaced apart and in an outward position away from the load screw within the housing.

6. The apparatus of claim 5, wherein said means for generally maintaining the wire cables comprises the load gear having a width sufficient to space the two wire cables apart, each significantly spaced away from the load screw, an elongated V shaped groove partially surrounding and confining each of the wire cables at their inner ends within the housing, and means on

the load nut for generally maintaining the wire cables within the V grooves within the housing.

7. The apparatus of claim 1, including at least two cables on each side of the load nut, and a said cable guide means and pulley for each cable.

8. A hoist for accurately drawing a load comprising:
a housing providing a main frame for the hoist,
an elongated load screw having external threads and mounted for rotation within the housing,
a fitting on a first end of the load screw, accessible from outside of the housing and configured to receive a rotational driving input without longitudinal translation of the screw gear within the housing,
a load nut having internal threads engaged with the external threads of the load screw so that rotation of the load screw causes the load nut to move longitudinally along the axis of rotation of the load screw, with the direction of movement of the load nut being dependent on the direction of the rotation of the load screw,
two coil chains, each having an inner end connected to the load nut within the housing and each having an outer end extending outside the housing, the two coil chains extending in

opposite directions from the housing each for connection to a load,

two idler sprockets connected in the housing for rotation and each in the path of one of the coil chains, the two idler sprockets having axes of rotation perpendicular to a plane containing the load screw and inner ends of the coil chains, each pulley having peripheral grooves or recesses for guiding a coil chain in tension, such that tension in the chains and motion of the chains in one direction due to rotation of the load screw is converted into said oppositely-directed motion and tension of the two chains outside the housing, and

chain guide means in the housing and positioned adjacent to the inner ends of the coil chains, for guiding and partially confining the coil chains as they move within the housing.

9. The apparatus of claim 8, wherein the chain guide means within the housing comprises spaced-apart, parallel, elongated, longitudinally-extending members generally U-shaped in cross section, positioned to envelop and confine alternate links of each coil chain for sliding movement along the U-shaped members at each side of the housing.

10. The apparatus of claim 9, further including stationary sprocket guides closely adjacent to each of the idler sprockets

to guide the coil chains in their passage around the sprockets and to generally retain the chains within the grooves or recesses of the idler sprockets even when not in tension.

11. The apparatus of claim 8, wherein the chain guide means within the housing comprises spaced apart, parallel, elongated, longitudinally-extending rods, four adjacent to each chain, positioned to confine the links of each chain against substantial transverse movement within the housing.

12. The apparatus of claim 11, further including stationary sprocket guides closely adjacent to each of the idler sprockets to guide the coil chains in their passage around the sprockets and to generally retain the chains within the grooves or recesses of the idler sprockets even when not in tension.

13. A hoist for accurately drawing a load comprising:
a housing providing a main frame for the hoist,
an elongated load screw having external threads and mounted for rotation within the housing,
a fitting on a first end of the load screw, accessible from outside of the housing and configured to receive a rotational driving input without longitudinal translation of the screw gear within the housing,

a load nut having internal threads engaged with the external threads of the load screw so that rotation of the load screw causes the load nut to move longitudinally along the axis of rotation of the load screw, with the direction of movement of the load nut being dependent on the direction of rotation of the load screw,

two synthetic web straps, each having an inner end connected to the load nut within the housing and each having an outer end extending outside the housing, the two synthetic web straps extending in opposite directions from the housing each for connection to a load,

two idler pulleys connected in the housing for rotation and each in the path of one of the synthetic web straps, the two idler pulleys having axes of rotation perpendicular to a plane essentially containing the load screw and inner ends of the synthetic web straps, each pulley guiding a synthetic web strap in tension, such that tension in the straps and motion of the straps in one direction due to rotation of the load screw is converted into said oppositely-directed motion and tension of the two straps outside the housing, and

strap guide means in the housing, for guiding and partially confining the synthetic web straps as they move within the housing.

14. The apparatus of claim 13, further including stationary pulley guides closely adjacent to an outer periphery of each of the idler pulleys to guide the wire cables in their passage around the pulleys and to generally retain the straps along the idler pulleys even when not in tension.

15. The apparatus of claim 13, wherein the strap guide means within the housing comprises the load nut having a substantial width extending in opposite directions, the two web straps being secured near ends of the arms of the load nut and each web strap being adjacent to a wall of the housing positioned outwardly from the load nut and from the web strap, and a flat bar guide adjacent to each web strap, each bar guide spaced inwardly, toward the load screw, from said wall of housing and each bar guide passing through the load nut, each bar guide being parallel to a said wall of the housing and forming with said wall an elongated channel for containing the web strap within the housing.

16. The apparatus of claim 13, wherein the strap guide means within the housing comprises, at each of two sides of the housing, a pair of guide rods spaced inwardly from a wall of the housing and providing a generally elongated channel within the housing within which a web strap is positioned, for confining in

guiding the web strap within the housing, the load nut having a substantial width, with two arms extending in opposite directions and reaching to positions adjacent to opposite said walls of the housing, the web straps being secured to the load nut near outer ends of said arms, and the guide rods passing through the load nut, just inwardly from the connections with the web straps.

17. A hoist for accurately drawing a load comprising:
 - a housing providing a main frame for the hoist,
 - an elongated load screw having external threads and mounted for rotation within the housing,
 - a fitting on a first end of the load screw, accessible from outside of the housing and configured to receive a rotational driving input without longitudinal translation of the screw gear within the housing,
 - a load nut having internal threads engaged with the external threads of the load screw so that rotation of the load screw causes the load nut to move longitudinally along the axis of rotation of the load screw, with the direction of movement of the load nut being dependent on the direction of rotation of the load screw,
 - two flexible tension members, each having an inner end connected to the load nut within the housing and each having an outer end extending outside the housing, the two flexible tension

members extending in opposite directions from the housing each for connection to a load,

two idler pulleys connected in the housing for rotation and each in the path of one of the flexible tension members, the two idler pulleys having axes of rotation perpendicular to a plane essentially containing the load screw and inner ends of the flexible tension members, each pulley guiding a flexible tension member in tension, such that tension in the tension members and motion of the tension members in one direction due to rotation of the load screw is converted into said oppositely-directed motion and tension of the two tension members outside the housing, and tension member guide means in the housing, for guiding and partially confining the flexible tension members as they move within the housing, including preventing the flexible tension members from contact with the load screw even during back-rotation of the load screw effective to feed the tension members out of the housing.

18. The apparatus of claim 17, wherein at least a part of the tension member guide means for each tension member passes through the load nut.